

## CLAIMS

*What is claimed is:*

1. In a Foreign Agent, a method of processing a registration request, comprising:
  - receiving a registration request identifying a Home Agent associated with the mobile node, the registration request further including a NAI associated with the mobile node;
  - providing a sub-NAI in the registration request, the sub-NAI uniquely identifying a session associated with the mobile node; and
  - sending the registration request to the Home Agent associated with the mobile node.
2. In a mobile node, a method of sending a registration request, comprising:
  - composing a registration request identifying a Home Agent associated with the mobile node, the registration request further including a NAI associated with the mobile node and a sub-NAI that uniquely identifies a session associated with the mobile node; and
  - sending the registration request.
3. The method as recited in claim 2, wherein the NAI identifies a userID submitted during PPP authentication.

4. The method as recited in claim 2, wherein the NAI is an identifier submitted for authentication of the mobile node.

5. The method as recited in claim 2, wherein the NAI is an e-mail address or a userID submitted in an application layer authentication.

6. The method as recited in claim 2, wherein composing the registration request comprises:

appending a NAI extension including the NAI to the registration request; and  
appending a sub-NAI extension including the sub-NAI to the registration request.

7. The method as recited in claim 2, further comprising:

detecting the session;  
wherein composing the registration request is performed in response to the detection of the session.

8. The method as recited in claim 2, wherein the session is associated with a device that is separate from the mobile node.

9. The method as recited in claim 2, wherein the session is associated with an application running on the mobile node.

10. The method as recited in claim 2, further comprising:

receiving a registration reply including an IP address associated with the session and identifying the NAI and the sub-NAI; and

mapping the NAI and the sub-NAI to the IP address associated with the session.

11. The method as recited in claim 10, wherein the registration reply includes a NAI extension including the NAI and a sub-NAI extension including the sub-NAI.

12. In a Foreign Agent, a method of registering a session with a Home Agent, the method comprising:

receiving a registration request identifying a Home Agent associated with the mobile node, the registration request further including a NAI identifying a userID and a sub-NAI that uniquely identifies a session associated with the NAI; and

sending the registration request to the Home Agent.

13. The method as recited in claim 12, wherein the NAI is a userID submitted during PPP authentication.

14. The method as recited in claim 12, wherein the NAI is an identifier submitted for authentication of the mobile node.

15. The method as recited in claim 12, wherein the NAI is an e-mail address or a userID submitted in an application layer authentication.

16. The method as recited in claim 12, wherein the registration request further comprises:

a NAI extension including the NAI; and  
a sub-NAI extension including the sub-NAI.

17. The method as recited in claim 12, wherein the session is associated with a device that is separate from the mobile node.

18. The method as recited in claim 12, wherein the session is associated with an application running on the mobile node.

19. In a Home Agent, a method of registering a session associated with a mobile node, comprising:

receiving a registration request, the registration request including a NAI identifying a mobile node and a sub-NAI that uniquely identifies a session associated with the NAI;

authenticating the mobile node using the NAI; and

composing a registration reply including the NAI identifying the mobile node and the sub-NAI that uniquely identifies the session associated with the NAI.

20. The method as recited in claim 19, wherein the NAI is a userID submitted during PPP authentication.

21. The method as recited in claim 19, wherein the registration request further comprises:

a NAI extension including the NAI; and

a sub-NAI extension including the sub-NAI.

22. The method as recited in claim 19, wherein the registration reply comprises:

a NAI extension including the NAI; and  
a sub-NAI extension including the sub-NAI.

23. The method as recited in claim 19, wherein the session is associated with a device that is separate from the mobile node.

24. The method as recited in claim 19, wherein the session is associated with an application running on the mobile node.

25. In a Home Agent, a method of registering a session associated with a mobile node, comprising:

receiving a registration request, the registration request including a NAI identifying a userID and a sub-NAI that uniquely identifies a session associated with the NAI;

obtaining an IP address associated with the session;

composing a registration reply including the IP address, the NAI identifying the userID and the sub-NAI that uniquely identifies the session associated with the NAI; and

sending the registration reply.

26. The method as recited in claim 25, wherein the NAI identifies a userID submitted during PPP authentication.

27. The method as recited in claim 25, wherein composing the registration reply comprises:

providing the IP address in a Home Address field of the registration reply;

appending a NAI extension to the registration reply, the NAI extension including the NAI; and

appending a sub-NAI extension to the registration reply, the sub-NAI extension including the sub-NAI.

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28. The method as recited in claim 25, wherein the registration request includes a NAI extension including the NAI and a sub-NAI extension including the sub-NAI.

29. The method as recited in claim 25, wherein the session is associated with a device that is separate from the mobile node.

30. The method as recited in claim 25, wherein the session is associated with an application running on the mobile node.

31. The method as recited in claim 25, wherein obtaining the IP address for the mobile node comprises:

determining whether a mobility binding table associated with the Home Agent includes a binding between the NAI, the sub-NAI and an IP address;

when it is determined that the mobility binding table associated with the Home Agent includes a binding between the NAI, the sub-NAI and an IP address, obtaining the IP address from the mobility binding table.

32. The method as recited in claim 31, wherein obtaining the IP address for the mobile node further comprises:

when it is determined that the mobility binding table associated with the Home Agent does not include a binding between the NAI, the sub-NAI and an IP address, obtaining a new IP address.

33. The method as recited in claim 31, wherein obtaining the IP address for the mobile node further comprises:

when it is determined that the mobility binding table associated with the Home Agent does not include a binding between the NAI, the sub-NAI and an IP address, obtaining an IP address from a Home Address field of the registration request.

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34. The method as recited in claim 31, further comprising:

when it is determined that the mobility binding table associated with the Home Agent does not include a binding between the NAI, the sub-NAI and an IP address, updating the mobility binding table associated with the Home Agent with an entry mapping the NAI and the sub-NAI to an IP address associated with the mobile node.

35. In a Foreign Agent, a method of processing a registration reply packet received from a mobile node, comprising:

receiving a registration reply including an IP address associated with the mobile node, a NAI identifying a userID and a sub-NAI that uniquely identifies a session associated with the NAI;

updating a visitor table with a mapping of the NAI, the sub-NAI, and the IP address associated with the mobile node; and  
sending the registration reply to the mobile node.

36. The method as recited in claim 35, wherein the NAI identifies a userID submitted during PPP authentication.

37. The method as recited in claim 35, wherein the registration reply includes a NAI extension including the NAI and a sub-NAI extension including the sub-NAI.

38. The method as recited in claim 35, wherein the session is associated with a device that is separate from the mobile node.

39. The method as recited in claim 35, wherein the session is associated with an application running on the mobile node.

40. A computer-readable medium for processing a registration request in a Foreign Agent, comprising:

instructions for receiving a registration request identifying a Home Agent associated with the mobile node, the registration request further including a NAI associated with the mobile node;

instructions for providing a sub-NAI in the registration request, the sub-NAI uniquely identifying a session associated with the mobile node; and

instructions for sending the registration request to the Home Agent associated with the mobile node.

41. A Foreign Agent adapted for registering a session with a Home Agent, comprising:

a processor; and

a memory, the memory storing therein:

instructions for receiving a registration request identifying a Home Agent associated with the mobile node, the registration request further including a NAI identifying a userID and a sub-NAI that uniquely identifies a session associated with the NAI; and

instructions for sending the registration request to the Home Agent.

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42. A computer-readable medium for registering a session associated with a mobile node in a Home Agent, comprising:

instructions for receiving a registration request, the registration request including a NAI identifying a mobile node and a sub-NAI that uniquely identifies a session associated with the NAI;

instructions for authenticating the mobile node using the NAI; and

instructions for composing a registration reply including the NAI identifying the mobile node and the sub-NAI that uniquely identifies the session associated with the NAI.

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43. A Home Agent configured for registering a session associated with a mobile node, comprising:

a processor; and

a memory, the memory storing therein:

instructions for receiving a registration request, the registration request including a NAI identifying a userID and a sub-NAI that uniquely identifies a session associated with the NAI;

instructions for obtaining an IP address associated with the session;

instructions for composing a registration reply including the IP address, the NAI identifying the userID and the sub-NAI that uniquely identifies the session associated with the NAI; and

instructions for sending the registration reply.

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